

What is claimed is:

1. A color liquid crystal display device comprising a color active matrix substrate, the color active matrix substrate having a transparent insulating substrate and a thin film transistor, a color filter, a black matrix, and a pixel electrode which are provided on said transparent insulating substrate, said thin film transistor having an inverted staggered structure in which a gate electrode, a gate insulating film, a semiconductor layer, an ohmic layer, and a pair of source and drain electrodes are deposited sequentially, and said ohmic layer, source and drain electrodes, and black matrix being of a same shape above a channel region formed in said semiconductor layer when seen in a deposit direction.

2. A color liquid crystal display device comprising a color active matrix substrate having a transparent insulating substrate and a thin film transistors, a color filter, a black matrix, and a pixel electrode which are provided on said transparent insulating substrate, said thin film transistor having an inverted staggered structure in which a gate electrode, a gate insulating film, a semiconductor layer, an ohmic layer, and a pair of source and drain electrodes are deposited sequentially, and said ohmic layer and source and drain electrodes being of a same shape when seen in a deposit direction.

3. The color liquid crystal display device according to claim 1, comprising a drain bus line connected to said drain electrode and having a laminated structure of metal films same as metal films respectively forming said semiconductor layer, ohmic layer, and source and drain electrodes.

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4. The color liquid crystal display device according to claim 1, wherein said black matrix is formed in such a manner as to cover at least a part of a peripheral portion of said color filter.

5 5. A manufacturing method of a color liquid crystal display device comprising the steps of:

forming a first conductive film on an entire surface of a transparent insulating substrate and patterning said first conductive film to form a gate electrode and a gate bus line;

10 depositing a gate insulating film, a semiconductor layer, an ohmic layer, and a second conductive film on said entire surface and patterning them to form an island of a thin film transistor and a drain bus line;

15 forming a color filter in a predetermined region on said transparent insulating substrate;

forming a light shielding film on said entire surface and patterning said light shielding film to form a black matrix which covers said island other than a channel region and covers a region other than said color filter at least;

20 forming a drain electrode and a source electrode in said island by removing said second conductive film and ohmic layer in a region corresponding to said channel region by using said black matrix as a mask;

forming a planarization film on said entire surface and making a contact hole to expose said source electrode; and

forming a transparent conductive film on said entire surface and patterning said transparent conductive film to form a pixel electrode, electrically connected to said source electrode,

in such a manner as to include at least a region overlapping said color filter.

6. A manufacturing method of a color liquid crystal display device, comprising the steps of:

5 forming a first conductive film on an entire surface of a transparent insulating substrate and patterning the first conductive film to form a gate electrode and a gate bus line;

10 depositing a gate insulating film, a semiconductor layer, an ohmic layer, and a second conductive film on said entire surface;

making said second conductive film, ohmic layer, and semiconductor layer into a predetermined pattern by using a step-wise photoresist to form an island of a thin film transistor and a drain bus line;

15 removing a thin film portion of said photoresist by ashing;

forming a drain electrode and a source electrode by removing said second conductive film and ohmic layer in a region corresponding to a channel region by using a remaining portion of
20 said photoresist;

forming a color filter in a predetermined region on said transparent insulating substrate;

forming a light shielding film on said entire surface and patterning said light shielding film to form a black matrix which
25 covers said island and covers a region other than said color filter at least;

forming a planarization film on said entire surface and making a contact hole to expose said source electrode; and

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forming a transparent conductive film on said entire surface and patterning said transparent conductive film to form a pixel electrode, electrically connected to said source electrode, in such a manner as to include at least a region overlapping said color filter.

7. A manufacturing method of a color liquid crystal display device, comprising the steps of:

forming a first conductive film on an entire surface of a transparent insulating substrate and patterning said first conductive film to form a gate electrode and a gate bus line;

depositing a gate insulating film, a semiconductor layer, an ohmic layer, and a second conductive film on said entire surface;

forming a step-wise photoresist composed of a thin film portion and a thick film portion on said transparent insulating substrate;

forming a drain electrode and a source electrode of a thin film transistor, and a drain bus line by making said second conductive film into a predetermined pattern by using said photoresist as a mask;

removing said thin film portion of said photoresist by ashing;

reflowing said thick film portion of said photoresist into a shape such that protects said drain electrode, source electrode, and a region between said drain electrode and source electrode;

forming an island of the thin film transistor by removing said ohmic layer and semiconductor layer by using said photoresist as a mask having undergone reflow;

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removing said photoresist;

forming a channel region by removing said ohmic layer in the region between said drain electrode and source electrode by using said drain electrode and source electrode as a mask;

5 forming a color filter in a predetermined region on said transparent insulating substrate;

forming a light shielding film on said transparent insulating substrate to form a black matrix which covers said island and cover a region other than said color filter at least;

10 forming a planarization film on an entire surface of said transparent insulating substrate and making a contact hole to expose said source electrode; and

forming a transparent conductive film to form a pixel electrode, electrically connected to said source electrode, in such a manner as to include at least a region overlapping said color filter.

15 8. The manufacturing method of a color liquid crystal display device according to claim 6, comprising a step of forming a transparent protection insulating film on said entire surface after said drain electrode and source electrode are formed, so that said color filter and black matrix are formed on said protection insulating film.

20 9. The manufacturing method of a color liquid crystal display device according to claim 7, comprising a step of forming a transparent protection insulating film on said entire surface after said drain electrode and source electrode are formed, so that said color filter and black matrix are formed on said protection insulating film.

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10. The manufacturing method of a color liquid crystal display device according to claim 5, wherein said color filter is formed by coating a transparent color resin over said transparent insulating substrate followed by exposure and development into a predetermined pattern, and said black matrix is formed by coating a black resin over said transparent insulating substrate followed by exposure and development into a predetermined pattern.

11. The manufacturing method of a color liquid crystal display device according to claim 5, wherein said color filter is formed by printing a transparent color resin on said transparent insulating substrate in a predetermined pattern, and said black matrix is formed by one of coating a black resin over said transparent insulating substrate followed by exposure and development into a predetermined pattern, and printing said black resin on said transparent insulating substrate in a predetermined pattern.

12. The manufacturing method of a color liquid crystal display device according to claim 5, wherein after said black matrix is formed by one of coating a black resin followed by exposure and development into a predetermined pattern, and printing said black resin on said transparent insulating substrate in a predetermined pattern, said color filter is formed by an ink jet method.

13. The manufacturing method of a color liquid crystal display device according to claim 5, wherein said contact hole making step includes:

forming a gate terminal portion contact hole to expose an end portion of said gate bus line and a drain terminal portion

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contact hole to expose an end portion of said drain bus line simultaneously with said contact hole; and

forming a gate terminal electrically connected to said gate bus line and a drain terminal electrically connected to said drain bus line by forming said transparent conductive film at an inner portion of each of said gate terminal portion contact hole and drain terminal portion contact hole, respectively.

14. The manufacturing method of a color liquid crystal display device according to claim 5, wherein said light shielding film is patterned in such a manner as to cover at least a part of a peripheral portion of said color filter.

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